Synthetic Data for Face Recognition: Current State and Future Prospects

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Abstract

Over the past years, deep learning capabilities and the availability of large-scale training datasets advanced rapidly, leading to breakthroughs in face recognition accuracy. However, these technologies are foreseen to face a major challenge in the next years due to the legal and ethical concerns about using authentic biometric data in AI model training and evaluation along with increasingly utilizing data-hungry state-of-the-art deep learning models. With the recent advances in deep generative models and their success in generating realistic and high-resolution synthetic image data, privacy-friendly synthetic data has been recently proposed as an alternative to privacy-sensitive authentic data to overcome the challenges of using authentic data in face recognition development. This work aims at providing a clear and structured picture of the use-cases taxonomy of synthetic face data in face recognition along with the recent emerging advances of face recognition models developed on the bases of synthetic data. We also discuss the challenges facing the use of synthetic data in face recognition development and several future prospects of synthetic data in the domain of face recognition.